

DOCKET NO.: 03-05 US

IN THE CLAIMS

1. (currently amended) A nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample fluid, comprising:
- a flow cell for holding the nuclear magnetic resonance sample fluid, said flow cell comprising an outer surface and an inner surface, said inner surface in contact with said fluid sample;
 - sample flow tubing for providing fluidic access to the flow cell;
 - a connector for fluidically connecting the sample flow tubing to the flow cell;
 - a flow cell adhesive securing a lateral surface of the flow cell to a surface of the connector; and
 - an internal flow cell adhesive-separation barrier extending between the surface of the flow cell and the surface of the connector, positioned to separate the flow cell adhesive from an interior surface of the flow cell whereby said adhesive is isolated from contact with said sample fluid.
2. (original) The flow cell assembly of claim 1, wherein the internal flow cell adhesive-separation barrier comprises an O-ring.
3. (original) The flow cell assembly of claim 1, wherein the internal flow cell adhesive-separation barrier comprises a plurality of annular ridges.
4. (currently amended) The flow cell assembly of claim 43, wherein the plurality of annular ridges are integrally formed with the connector.
5. (canceled)
6. (previously amended) The flow cell assembly of claim 1, further comprising an external flow cell adhesive-separation barrier extending between the outer surface of the flow cell and the inner surface of the connector, positioned to separate the flow cell adhesive from an external environment of the flow cell, and to center the flow cell with respect to the connector.

DOCKET NO.: 03-05 US

7. (original) The flow cell assembly of claim 1, wherein the connector includes:
a lateral wall enclosing a flow cell connector bore sized to accommodate an end region of the flow cell, wherein the flow cell adhesive is situated along the flow cell connector bore; and
an annular stop for constraining the flow cell longitudinally when the flow cell is positioned in the flow cell connector bore.
8. (original) The flow cell assembly of claim 1, wherein the flow cell assembly further includes:
a sample flow tubing adhesive securing a lateral outer surface of the sample flow tubing to an inner surface of the connector; and
an internal sample flow tubing adhesive-separation barrier extending between the outer surface of the sample flow tubing and the inner surface of the connector, positioned to separate the sample flow tubing adhesive from an interior of the sample flow tubing.
9. (original) The flow cell assembly of claim 1, wherein the connector comprises a radial adhesive-insertion channel extending from an outer surface of the connector to an inner surface of the connector along the flow cell connector bore.
10. (original) The flow cell assembly of claim 1, wherein the connector comprises an adhesive-holding reservoir extending along an adhesive interface between the flow cell and the connector.
11. (original) The flow cell assembly of claim 10, wherein the adhesive-holding reservoir is annular.
12. (original) The flow cell assembly of claim 10, wherein the adhesive-holding reservoir is helical.
13. (original) The flow cell assembly of claim 1, wherein the connector comprises a plurality of longitudinal channels defined along the connector, for allowing a passage of a temperature-

DOCKET NO.: 03-05 US

control gas along the connector.

14. (currently amended) A nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample fluid, comprising:

a flow cell for holding the nuclear magnetic resonance sample, said flow cell comprising an inner surface, said inner surface in contact with said fluid sample;
inlet and outlet sample flow tubing for providing fluidic access to the flow cell; and
a pair of connectors including a first connector for connecting the inlet sample flow tubing to the flow cell, and a second connector for connecting the outlet sample flow tubing to the flow cell, each of the pair of connectors being secured to the flow cell by an adhesive region, wherein the adhesive region is separated from an interior surface of the flow cell by an annular adhesive-separation barrier extending between the flow cell and said each of the pair of connectors and said adhesive is isolated from contact with said sample fluid.

15. (original) The flow cell assembly of claim 14, wherein the adhesive-separation barrier comprises an O-ring.

16. (original) The flow cell assembly of claim 14, wherein the adhesive-separation barrier comprises a plurality of annular ridges.

17. (currently amended) A nuclear magnetic resonance probe comprising:

a nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample fluid, comprising:

a flow cell for holding the nuclear magnetic resonance sample, said flow cell comprising an inner surface, said inner surface in contact with said fluid sample;

inlet and outlet sample flow tubing for providing fluidic access to the flow cell;
a pair of connectors including a first connector for connecting the inlet sample flow tubing to the flow cell, and a second connector for connecting the outlet sample flow tubing to the flow cell, each of the pair of connectors

DOCKET NO.: 03-05 US

being secured to the flow cell by an adhesive region, wherein the adhesive region is separated from an interior surface of the flow cell by an annular adhesive-separation barrier extending between the flow cell and said each of the pair of connectors whereby said adhesive is isolated from contact with said sample fluid; and

a set of nuclear magnetic resonance coils coupled to the flow cell assembly; for performing a nuclear magnetic resonance measurement on the sample.

18. (currently amended) A nuclear magnetic resonance method comprising:
- inserting a nuclear magnetic resonance sample fluid into a nuclear magnetic resonance flow cell assembly comprising
- a flow cell for holding the nuclear magnetic resonance sample, said flow cell comprising an inner surface, said inner surface in contact with said fluid sample;
- inlet and outlet sample flow tubing for providing fluidic access to the flow cell;
- a pair of connectors including a first connector for connecting the inlet sample flow tubing to the flow cell, and a second connector for connecting the outlet sample flow tubing to the flow cell, each of the pair of connectors being secured to the flow cell by an adhesive region, wherein the adhesive region is separated from an interior surface of the flow cell by an annular adhesive-separation barrier extending between the flow cell and said each of the pair of connectors whereby said adhesive is isolated from contact with said sample fluid; and
- performing a nuclear magnetic resonance measurement on the sample fluid while the sample fluid is situated in the flow cell.

19. (original) The method of claim 18, further comprising inserting the flow cell assembly into a nuclear magnetic resonance probe through a central bore of the nuclear magnetic resonance probe while the nuclear magnetic resonance probe is positioned in a nuclear magnetic resonance magnet.

20. (original) The method of claim 19, further comprising removing the flow cell assembly from

DOCKET NO.: 03-05 US

the nuclear magnetic resonance probe through the central bore while the nuclear magnetic resonance probe is positioned in the nuclear magnetic resonance magnet.

21. (currently amended) A nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample fluid, comprising:

- a flow cell for holding the nuclear magnetic resonance sample fluid said flow cell having an internal surface in contact with said fluid sample, the flow cell having a first helical thread along a lateral surface of the flow cell;
- sample flow tubing for providing fluidic access to the flow cell;
- a connector for fluidically connecting the sample flow tubing to the flow cell, the connector including a flow cell connector bore sized to accommodate an end region of the flow cell, the connector having a second helical thread matching the first helical thread, for securing the connector to the flow cell; and
- a sealing barrier positioned between a transverse end surface of the flow cell and a transverse surface of the connector, the sealing barrier being pressed between the flow cell and the connector when the flow cell and the connector are secured together, for sealing an interface between the flow cell and the connector whereby said adhesive is isolated from contact with said sample fluid.

22. (original) The flow cell assembly of claim 21, wherein the sealing barrier comprises an O-ring.

23. (original) The flow cell assembly of claim 21, wherein the sealing barrier comprises a ferrule.

24. (original) The flow cell assembly of claim 21, wherein the connector laterally encloses the flow cell along at least part of the second helical thread.

25. (original) The flow cell assembly of claim 21, wherein the flow cell laterally encloses the connector along at least part of the first helical thread.

DOCKET NO.: 03-05 US

26. (original) The flow cell assembly of claim 21, wherein the connector comprises a connector body, and a distinct tubular extension part secured to the connector body.
27. (original) The flow cell assembly of claim 26, wherein the tubular extension part has a tapered outer surface at a distal end of the tubular extension part.
28. (original) The flow cell assembly of claim 21, wherein the connector comprises a plurality of longitudinal channels defined along an outer surface of the connector, for allowing a passage of a temperature-control gas along the connector.
29. (currently amended) A nuclear magnetic resonance probe comprising:
a nuclear magnetic resonance flow cell assembly for holding a nuclear magnetic resonance sample fluid, comprising:
a flow cell for holding the nuclear magnetic resonance sample fluid, said flow cell having an internal surface in contact with said fluid sample, the flow cell having a first helical thread along a lateral surface of the flow cell;
sample flow tubing for providing fluidic access to the flow cell;
a connector for fluidically connecting the sample flow tubing to the flow cell, the connector including a flow cell connector bore sized to accommodate an end region of the flow cell, the connector having a second helical thread matching the first helical thread, for screwing the connector to the flow cell; and
a sealing barrier positioned between a transverse end surface of the flow cell and a transverse surface of the connector, the sealing barrier being pressed between the flow cell and the connector when the flow cell and the connector are screwed together, for sealing an interface between the flow cell and the connector whereby said adhesive is isolated from contact with said sample fluid; and
a set of nuclear magnetic resonance coils coupled to the flow cell assembly, for performing a nuclear magnetic resonance measurement on the sample fluid.

DOCKET NO.: 03-05 US

30. (currently amended) A nuclear magnetic resonance method comprising:
inserting a nuclear magnetic resonance sample into a nuclear magnetic resonance flow cell assembly comprising
a flow cell for holding the nuclear magnetic resonance sample, the flow cell having a first helical thread along a lateral surface of the flow cell;
sample flow tubing for providing fluidic access to the flow cell;
a connector for fluidically connecting the sample flow tubing to the flow cell, the connector including a flow cell connector bore sized to accommodate an end region of the flow cell, the connector having a second helical thread matching the first helical thread, for securing the connector to the flow cell; and
a sealing barrier positioned between a transverse end surface of the flow cell and a transverse surface of the connector, the sealing barrier being pressed between the flow cell and the connector when the flow cell and the connector are secured together, for sealing an interface between the flow cell and the connector whereby said adhesive is isolated from contact with said sample fluid; and
performing a nuclear magnetic resonance measurement on the sample while the sample fluid is situated in the flow cell.
31. (original) The method of claim 30, further comprising inserting the flow cell assembly into a nuclear magnetic resonance probe through a central bore of the nuclear magnetic resonance probe while the nuclear magnetic resonance probe is positioned in a nuclear magnetic resonance magnet.
32. (original) The method of claim 31, further comprising removing the flow cell assembly from the nuclear magnetic resonance probe through the central bore while the nuclear magnetic resonance probe is positioned in the nuclear magnetic resonance magnet.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.